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NEC Laboratories America, Inc.
4 Independence Way
Princeton, NJ 08540

EXAMINER

TODD, GREGORY G

ART UNIT	PAPER NUMBER
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2157

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/813,484

Applicant(s)

DUBNICKI ET AL.

Examiner

Gregory G. Todd

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to applicant's amendment and request for continued examination filed, 23 March 2007, of application filed, with the above serial number, on 30 March 2004 in which claims 1, 2, 6, 11, 16, 18, and 21-26 have been amended. Claims 1-27 are therefore pending in the application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear how "a capacity of the number of slots" can exceed the physical storage capacity of the node. The relationship of the capacities needs to be clarified. In other words, if the node has a capacity of 8 slots, it is not clear how that number relates to a storage capacity.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al (hereinafter "Zhang", 6,985,928).

As per Claim 1, Zhang teaches a method for improving utilization in a peer-to-peer network having a plurality of nodes, the method comprising:

assigning one or more storage slots to each node in the peer-to-peer network, a first portion of the storage slots allocated for hosting storage zones and any remaining storage slots at each node allocated as a free slot reserve storage slot (at least col. 2, lines 27-42; col. 3 line 47 – col. 4 line 54; p2p system consisting of nodes being in storage zones);

inserting data into the storage zones (at least col. 3, lines 55-67; objects stored in zones); and

when a storage zone reaches its full capacity, splitting the data in the storage zone into a first and second portion, converting a free slot reserve storage slot into a new storage zone, and transferring the second portion of the data to the new storage zone (at least col. 3 line 47 - col. 4 line 54; parent zone split into two subzones, zones being crowded – placing (converting) object in other (new) subzone).

As per Claim 2. The method of claim 1 wherein each node is assigned more storage slots than its actual physical capacity allows (at least col. 4 line 39 – col. 5 line 34; storage utilization).

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As per Claim 3. The method of claim 2 wherein each node is allocated N-1 virtual slots for each N storage slots allocated (at least col. 3 line 47 - col. 4 line 54).

As per Claim 4. The method of claim 2 wherein a storage zone at a node is transferred to another node in the peer-to-peer network if the data inserted into the storage zones at the node fills the actual physical capacity of the node (at least col. 4 line 39 – col. 5 line 56; storage utilization).

As per Claim 5. The method of claim 4 where a local search for candidate nodes in a transfer set is conducted prior to transfer of the storage zone (at least col. 4 line 39 – col. 5 line 34; subzone having least # of nodes).

As per Claim 6. The method of claim 1 wherein the new storage zone is transferred to a free slot reserve storage slot on a different node when the storage zones hosted at the node exceed the storage slots allocated at the node (at least col. 4 line 39 – col. 5 line 34; node in available subzone).

As per Claim 7. The method of claim 6 where a local search for candidate nodes in a transfer set is conducted prior to transfer of the new storage zone at least col. 4 line 39 – col. 5 line 34).

As per Claim 8. The method of claim 1 wherein the data is associated with hashkeys of a hash function and where each storage zone is responsible for a subset of all hashkeys (at least col. 2, lines 52-60; DHS).

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As per Claim 9. The method of claim 8 wherein the hashkeys are uniformly distributed by the hash function (at least col. 2, lines 52-60; DHS).

As per Claim 10. The method of claim 1 wherein the storage slots are of a fixed-size (at least col. 3, lines 55-67; one size for parent zone).

As per Claim 11, Zhang teaches a method for improving utilization in a peer-to-peer network, the method comprising:

assigning one or more storage slots to each node in the peer-to-peer network, a first portion of the storage slots allocated for hosting storage zones and any remaining storage slots at each node allocated as a free slot reserve storage slot (at least col. 2, lines 27-42; col. 3 line 47 – col. 4 line 54; p2p system consisting of nodes being in storage zones); and

when a new node is added to the peer-to-peer network, transferring at least one storage zone from another node in the peer-to-peer network to the new node so as to maintain at least one storage slot at each node in the peer-to-peer network (at least col. 3 line 47 - col. 4 line 54).

As per Claim 12. The method of claim 11 wherein the storage zone at the another node is eagerly split into a first and second portion with the second portion transferred to the new storage zone at the new node (at least col. 3 line 47 - col. 4 line 54; parent zone split into two subzones, zones being crowded placing object in other subzone).

As per Claim 13. The method of claim 12 wherein each node maintains no more than one eagerly split zone (at least col. 3 line 47 - col. 4 line 54; parent zone).

As per Claim 14. The method of claim 11 wherein the another node has two or more storage zones and one of these storage zones is transferred to the new node to become the new storage zone on the new node (at least col. 3 line 47 - col. 4 line 54; parent zone split into two subzones, zones being crowded placing object in other subzone).

As per Claim 15. The method of claim 11 wherein a search is conducted among a local set of nodes in the peer-to-peer network for a storage zone to transfer to the new node (at least col. 4 line 39 – col. 5 line 34; subzone having least # of nodes).

As per Claim 16, Zhang teaches a node for a peer-to-peer network, the node assigned a number of slots for storage of objects in the peer-to-peer network where a capacity of the number of slots exceeds actual physical storage capacity of the node (at least col. 4 line 39 – col. 5 line 34; storage utilization with objects placed into new subzones upon 'overcrowding').

As per Claim 17. The node of claim 16 where the number of slots maintained by the node is equal to 2 times $N-1$ where N is a number of slots that would fill the node's actual physical storage capacity (at least col. 3 line 47 - col. 4 line 54).

As per Claim 18. The node of claim 16 where the objects stored in one of the number of slots at the node are transferred to another node in the peer-to-peer network if objects stored in the slots at the node fill the actual physical storage capacity of the node (at

least col. 3 line 47 - col. 4 line 54; zones being crowded placing object in other subzone).

As per Claim 19. The node of claim 16 wherein the objects are associated with hashkeys of a hash function and where each node is responsible for a subset of all hashkeys (at least col. 2, lines 52-60; DHS).

As per Claim 20. The node of claim 16 wherein the slots are of a fixed-size (at least col. 3, lines 55-67; one size for parent zone).

As per Claim 21. The method of claim 1, wherein each storage zone is located within a particular physical node (at least col. 3, lines 14-21).

As per Claim 22. The method of claim 21, wherein each storage slot is located within a particular physical node (at least col. 3, lines 14-21).

As per Claim 23. The method of claim 11, wherein each storage zone is located within a particular physical node (at least col. 3, lines 14-21).

As per Claim 24. The method of claim 23, wherein each storage slot is located within a particular physical node (at least col. 3, lines 14-21).

As per Claim 25. The method of claim 1, wherein a zone is hosted within a slot and a size of the slot is a system-wide constant representing the limit size to which a zone can grow before it fills the slot and it must be split (at least col. 3 line 55 – col. 4 line 54; one size for parent zone, zone is logical space including one or more objects).

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As per Claim 26. The method of claim 11, wherein a zone is hosted within a slot and a size of the slot is a system-wide constant representing the limit size to which a zone can grow before it fills the slot and it must be split (at least col. 3 line 55 – col. 4 line 54; one size for parent zone, zone is logical space including one or more objects).

As per Claim 27. The node of claim 16 wherein there are one or more real slots that consume the entire actual physical capacity of the node and one or more virtual slots that have no actual physical storage capacity associated with them (at least col. 3 line 47 - col. 4 line 54).

Response to Arguments

5. Applicant's arguments filed 23 March 2007 have been fully considered but they are not persuasive. Applicants argue:

a. Zhang does not teach placing storage zones within a node. While this interpretation is presented in the claims, the claim is up to interpretation. For example, 3 nodes might be assigned slots, wherein nodeA has slots 1-3, nodeB has slots 4-6, and nodeC has slots 7-9. A *portion* of the slots are allocated for hosting storage zones, thus while the portion *may* be slots 2-3 and thus within the same node as the arguments seem to contend, the portion could *also* be slots 3-4 and 7, thus the zone among 3 nodes. Further, Zhang explicitly teaches "the locations..can be same node in the P2P system, different file systems within the same node", etc. (see col. 3, lines 14-21). Thus, the feature is taught by Zhang.

b. Zhang does not teach splitting the zone into a first and second portion upon reaching full capacity. In response to applicant's argument that Zhang teaches the possibility of a parent-child relationship, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case, Zhang's system is structurally the same as the zone would be divided into two subzones (see col. 3, lines 55-67). Further, Examiner fails to see relevancy as to where the zones are described in the specification of the corresponding applications. Further, Applicant offers support for the converting step of claim 1 amendment @ paragraph 4, the summary of the current invention, as well.

c. Examiner maintains Zhang teaches the claims as mapped to each dependent claim, and as each independent claim is taught by Zhang, the dependent claims are similarly rejected as being dependent on a independent claim rejected under Zhang.

d. Applicant argues Zhang fails to teach allocating more storage slots than its actual physical storage capacity. However, it can be seen from Applicant specification that the term "slot" is used interchangeably with zone (see par. 19), and further par. 17, where these "slots" are first referenced. Examiner does not see a clear definition of the term, other than it being implied a slot is a part (**whole** or in part) of the zone. Further, the language of the claim is unclear,

(claim 16); as it is vague how a "a capacity of the number of slots" can exceed a storage capacity...in other words, if the number of slots = 8, for example, and the storage capacity = 1 TB, the claim doesn't allow for this relationship to be defined. As such, Zhang teaches the "slots" and allocating more storage slots than its actual physical storage capacity as Zhang teaches the storage capacity and utilization may be over 80% (see col. 5, lines 11-23), and as seen from the specification of the current invention that over a 50% utilization results in the oversubscription desired of the invention (see par. 23), and specifically mentions 80-85% utilization being guaranteed, Zhang's system performs the claimed preferred invention.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Previously cited Goodman, Moulton et al, Franzenburg, Tormasov et al, and Hensley et al are cited for disclosing pertinent information related to the claimed invention. Applicants are requested to consider the prior art reference for relevant teachings when responding to this office action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory G. Todd whose telephone number is (571)272-4011. The examiner can normally be reached on Monday - Friday 9:00am-6:00pm w/ first Fridays off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571)272-4001. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gregory Todd



Patent Examiner

Technology Center 2100



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